Common bile duct stones present in 15% of patients with biliary pancreatitis.

**Background:** Biliary pancreatitis is caused by transient obstruction of the pancreatic duct by a gallstone. Most patients pass these stones spontaneously. A cholecystectomy resolves future recurrences.

**Objective:** To define the optimal timing of laparoscopic cholecystectomy after biliary pancreatitis.

**Design:** Retrospective analysis of the records of patients who had a laparoscopic cholecystectomy for biliary pancreatitis.

**Participants:** 99 patients had acute abdominal pain, serum amylase elevation, and confirmed gallstones.

**Methods:** Patients were divided into an early (n=32) and late (n=67) group based on whether the gallbladder was removed within 2 weeks admission or 2 weeks after admission. Patients with elevated bilirubin and common duct stones demonstrated on magnetic resonance cholangiopancreatography (MRCP) or ultrasound had endoscopic retrograde cholangiopancreatography (ERCP) and sphincterotomy performed. The primary end point was gallstone-related complications including biliary colic, cholecystitis, cholangitis, or recurrent pancreatitis.

**Interventions:** ERCP was performed in 5 early patients and 24 late patients. Conversion to an open cholecystectomy was necessary in 4 early and 2 late patients.

**Results:** 15 late cholecystectomy patients had recurrent symptoms before their cholecystectomy. Nine of these developed recurrent pancreatitis, 4 had biliary colic, and 2 had acute cholecystitis. None of the early patients had recurrent symptoms. Complications after cholecystectomy in either group were similar, and no one died in either group. Overall, 15% of patients had biliary stones extracted from the common bile duct.

**Conclusions:** Delaying cholecystectomy for 2 weeks after an episode of biliary pancreatitis is associated with an increase in recurrent pancreatitis.

**Reviewer's Comments:** Acosta's paper from 1974 noting gallstones as the etiology of biliary pancreatitis is the first reference in this paper. The timing of cholecystectomy and the need to clear the common bile duct are the discussion points. Routine clearance of the bile duct with ERCP has fallen out of favor as most stones will pass. A patient with cholangitis falls out of this recommendation and needs drainage of the bile duct emergently. "Early" is described in various ways, and these authors chose 2 weeks. I believe the timing should even be faster. Once the abdominal pain subsides and the patients are nontender without jaundice, we perform a cholecystectomy. Routine cholangiography is not used; if persistent symptoms exist postoperatively, ERCP is performed. The finding that only 15% of these patients had stones extracted from the biliary ducts emphasizes that routine ERCP has a questionable risk-to-benefit ratio. Additionally, the number of these stones that would pass spontaneously is unknown. Whether routine MRCP can identify patients who should have ERCP preoperatively is unknown. We believe our approach is safe and cost-effective. Most of our patients are have their surgery within 1 week of admission to the hospital. Early operation is good for these patients. (Reviewer-John A. Weigelt, MD).

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Keywords: Biliary Pancreatitis

Print Tag: Refer to original journal article
Surgery for TOS Improves Quality of Life

Surgical Intervention for Thoracic Outlet Syndrome Improves Patient's Quality of Life.

Chang DC, Rotellini-Coltvet LA, et al:

J Vasc Surg 2009; 49 (March): 630-637

First rib resection for thoracic outlet syndrome improves quality of life, especially for patients with venous obstruction symptoms.

Background: Thoracic outlet syndrome (TOS) can present with neurogenic or venous symptoms. Diagnosis of venous symptoms is often possible with ultrasound, while no definitive test exists to confirm neurogenic TOS. Treatment outcomes are often questioned given the uncertainty of the diagnosis in some patients.

Objective: To determine long-term outcomes of patients with TOS treated by transaxillary rib resection and scalenectomy.

Design/Participants: Prospective evaluation of 70 patients undergoing surgery for TOS; 44 patients had neurogenic symptoms and 26 had venous symptoms.

Methods: Patients had failed physical therapy before surgical referral. All patients had a preoperative quality-of-life assessment, which included the Short-Form 12 (SF-12) and the Disability of the Arm, Shoulder, and Hand (DASH) tools. DASH measures upper extremity-related symptoms and the functional status at a level of disability. The primary outcome was assessment of functional status based on whether the patient had neurogenic or venous symptoms.

Interventions: The SF-12 and DASH were given preoperatively and at 3, 6, 12, 18, and 24 months postoperatively.

Results: Of the 44 neurogenic patients, 35 were women and 9 were men; their average age was 35 years, and 30% had a history of trauma to the area. Among the 26 venous patients, there were 13 women and 13 men with an average age of 31 years. None of these patients had a history of trauma. Neurogenic patients had baseline SF-12 Physical Component Scores (PCS) that were significantly worse than those of venous patients. Both groups had improved PCS scores postoperatively. Time to achieve normal quality of life for physical functioning was 23 months for neurogenic and 11 months for venous patients. Neurogenic patients had baseline DASH scores similar to those of patients with a rotator cuff tear and worse than those of venous patients. DASH scores improved for both types of patients. A return to work was more common among patients with venous symptoms (77%) than neurogenic symptoms (50%).

Conclusions: Functional outcome scores improved after surgical therapy for TOS. Patients with venous symptoms had better results than patients with neurogenic symptoms.

Reviewer's Comments: Patients with TOS suffer measurable reductions in physical function. Improvements in functional outcome scores, using the SF-12 or DASH, show improved physical functioning. Differences between patients based on presenting symptoms were also found. Patients with neurogenic symptoms did not return to work as often as their venous counterparts. Whether this is due to TOS or other factors is not clear from this report, especially since 30% of the neurogenic patients had a history of trauma. Regardless, this article demonstrates patient improvement after surgical treatment for TOS, which is often difficult to assess. It also suggests that outcome will depend on patient presentation. Both are valuable findings when approaching this clinical problem. (Reviewer-John A. Weigelt, MD).

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Keywords: Thoracic Outlet Syndrome

Print Tag: Refer to original journal article
A dressing using a chlorhexidine sponge reduces catheter infection rates.

**Background:** Indwelling catheter infections are the leading cause of hospital-acquired infection in our patients. This is especially problematic for patients with central venous catheters.

**Objective:** To determine if using a dressing impregnated with chlorhexidine can reduce catheter infection and to evaluate how often the dressing should be changed.

**Design/Participants:** This prospective, randomized, clinical trial involved 1636 patients (of the original 1653 patients, 17 subsequently withdrew), who had 3778 catheters and represented 28,931 catheter-days.

**Methods:** All catheters in a given patient were managed similarly. Arterial catheters (46%) and central venous catheters (54%) were included. Definitions were used for catheter colonization, catheter-related sepsis without bloodstream infection, and catheter-related bloodstream infection. The patients were divided into 4 groups: 416 patients had a standard dressing changed every 3 days; 412 had a chlorhexidine dressing changed every 3 days; 412 had a standard dressing changed every 7 days; and 413 had a chlorhexidine dressing changed every 7 days. The main end point was major catheter infection with or without bloodstream infection.

**Interventions:** All catheters were placed under sterile conditions. Catheter tip cultures were used to assess for catheter infection.

**Results:** The chlorhexidine dressing significantly reduced the rate of major catheter infection from 1.4 per 1000 catheter-days to 0.6 per 1000 catheter-days. Bloodstream infection fell from 1.3 per 1000 catheter-days to 0.4 per 1000 catheter-days. There was no difference in results when comparing 3- or 7-day dressing changes.

**Conclusions:** Chlorhexidine-impregnated catheter dressings reduce major catheter infection and can be changed every 7 days safely.

**Reviewer's Comments:** You need to read this article, but read it closely. The introduction is all about central venous lines—never a squeak about other types of lines. However, in the methods, arterial catheters are introduced and comprise approximately 50% of the catheters. A separate analysis is never performed on central venous catheters alone—would that have made a difference? I cannot tell from the data presented. Mixing these 2 types of catheters is a major design flaw. Unplanned dressing changes were common (45%) because of dressing soilage or leakage. Only 10% of catheters in the 7-day groups were in place for all 7 days. Apparently, many catheters were included in this trial that never had the chance to be evaluated in terms of the study goals. We need to know if this catheter management approach is successful in reducing infection in catheters that remain in the patient for >3 days. After 3 days, most studies show an increase in infection rates, especially among central venous catheters. This study does not provide us with the information we all crave. The best suggestion for reducing major catheter infection is still "don't place the catheter and, if placed, get rid of it as soon as possible." (Reviewer-John A. Weigelt, MD).

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Keywords: Catheter Infection

Print Tag: Refer to original journal article
Hospital readmissions are common, ubiquitous, and costly to Medicare.

**Background:** Rehospitalization rates are tagged as the next quality agenda. Reducing a second hospital stay within a short period is a method to cut costs. Understanding the reasons for rehospitalizations is the first step in reducing their prevalence.

**Objective:** To determine the frequency of unplanned hospital readmissions within 30 days for Medicare patients, the type of index admissions, and the reasons for readmission.

**Design:** Retrospective review of claims data for 2003 to 2004.

**Participants:** 11,855,702 patients were included in the analysis.

**Methods:** Rehospitalization was defined as the number of patients discharged from an acute care hospital divided by the number discharged alive from the hospital. The primary rate sought was 1 within 30 days of discharge. Exclusions included transfers to another acute care, a long-term care facility, or rehabilitation admissions. The top 5 medical and surgical diagnosis-related groups for readmissions were identified, as were the reasons for admission. An assumption was made that 10% of readmissions were planned, and these were excluded, as were patients who died. A proportional hazards model was used to identify predictors of readmission.

**Results:** 20% of patients were readmitted within 30 days and 28% within 60 days, with medical conditions accounting for 78% of all readmissions. Medical conditions at the index admission most likely to result in readmission included heart failure, pneumonia, chronic obstructive pulmonary disease, psychoses, and gastrointestinal problems. The corresponding surgical conditions were cardiac stent placement, major hip or knee surgery, vascular surgery, major bowel surgery, and hip or knee surgery. Medical conditions predominated as reasons for readmission. Heart failure was number 1 and pneumonia was number 2. The authors also calculated rates from all 50 states. The estimated cost of unplanned readmissions was $17 billion.

**Conclusions:** Readmissions are common, ubiquitous, and costly to Medicare.

**Reviewer’s Comments:** The scrutiny is already beginning on our readmission rates. This report gives us some idea of where we might start to evaluate readmission rates. The congestive heart failure patient has been a target for years, but the other diagnoses identified (medical and surgical) provide some insight into the problem. While primarily a medical problem, surgical diagnoses account for 20% of readmissions. Ideas to reduce these readmissions are provided and include better discharge planning and better or closer follow-up after discharge. Which (if any) of these recommendations will make it into any type of reform package is unknown at this time. Suffice it to say that you will be hearing about readmissions from your hospital. This article provides good background reading as the discussion develops. (Reviewer-John A. Weigelt, MD).
Most patients with small aneurysms undergoing surveillance prefer endovascular repair.

**Background:** To use a structured interview technique to investigate patient preferences for future elective abdominal aortic aneurysm (AAA) repair.

**Methods:** All patients undergoing periodic ultrasound surveillance at 2 hospitals in the U.K. were invited to participate in the research study. All patients had seen a vascular surgeon, but none had been scheduled for elective repair. After written consent, patients were mailed information about both types of repair, along with a questionnaire developed iteratively by the investigators and methodological consultants. The questionnaire had several items that focused on the specific differences between the methods of aneurysm repair and asked the participants to rate items on a 5-point Likert scale. After completing the questionnaire, patients were interviewed by 1 of the investigators, with the interview guided by the responses on the questionnaire. Each interview also had opportunities for unstructured questions and discussion.

**Results:** 106 patients were invited to participate, 6 were subsequently excluded, and 22 declined to consent; 56 patients (51 men and 5 women; mean age, 74.7 years; mean aneurysm size, 4.4 cm) consented and provided usable contact information. Of these patients, 84% preferred endovascular repair and 3% voiced no preference. The 7 patients who preferred open repair were significantly younger (62 vs 74 years; \( P =0.009 \)). The primary reason for preferring open repair was the lack of long-term data available for endovascular repair. For those preferring endovascular repairs, risk of postoperative death and major organ failure were judged most important, and exposure to radiation and sexual dysfunction were least important.

**Conclusions:** Most patients with small aneurysms would prefer endovascular repair.

**Reviewer’s Comments:** Although the overall conclusions of this study are not surprising, delineation of the factors considered important by a representative sample of patients with the disease in question is valuable information for those involved in counseling patients about one type of repair versus another. The small number of patients preferring open repair may be truly representative or may be due to the relatively small sample size. However, their reasons for preferring open repair cannot be considered representative, so further study of this population may be warranted. (Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: Aortic Aneurysm

Print Tag: Refer to original journal article
The combination of steroids and vasopressin for septic shock appears to be better than the combination of steroids and norepinephrine.

**Background:** To provide evidence from a post-hoc analysis of a previous randomized trial comparing vasopressin to norepinephrine in an attempt to shed some light on the exact role of steroids and vasopressin for treating patients with sepsis.

**Methods:** The initial trial was a randomized, controlled trial of patients >16 years of age with sepsis who were unresponsive to fluid administration and low-dose norepinephrine. Patients had at least 1 organ dysfunction and were enrolled at 1 of 28 ICUs in Canada, Australia, or the United States. Patients were randomized to receive vasopressin or norepinephrine, with a maximum dose of vasopressin of 0.03 units/min and a maximum dose of norepinephrine of 15 μg/min. Those not responding to maximum doses of the study drug could receive open-label vasopressors to achieve a mean arterial pressure >65 mm Hg. The use of steroids was left to the individual treating physician. This post-hoc analysis investigated the interaction of vasopressin and steroids on the primary outcome of mortality using logistic regression. For this analysis, the use of steroids was defined as at least 1 treatment day during the 28-day study period.

**Results:** In the original trial, 589 patients received steroids and 190 did not. There was a statistically significant interaction between vasopressin and steroids ($P = 0.008$). In patients with septic shock treated with steroids, those who also received vasopressin had a significantly lower mortality than those treated with norepinephrine (36% vs 45%; $P = 0.03$). Steroids significantly increased plasma vasopressin levels by 33% at 6 hours. In surviving patients, there was no difference in days free from organ dysfunction between those treated with vasopressin versus norepinephrine ($P = 0.08$). In patients not receiving steroids, vasopressin was associated with a nonsignificant increase in mortality compared with norepinephrine (34% vs 21%; $P = 0.06$).

**Conclusions:** There was a significant interaction between steroids and vasopressin, with a decrease in mortality in patients treated with steroids and vasopressin compared to those treated with steroids and norepinephrine.

**Reviewer’s Comments:** This study may be helpful in advancing the treatment of sepsis from a scientific and research standpoint, but it is difficult to understand the take-home clinical message. Should I avoid steroids, as those patients treated without steroids had an improved survival regardless of pressor use? However, those patients were not as sick, so that is not entirely unexpected. In patients not responsive to fluid and norepinephrine administration, should I give steroids only if I also give vasopressin? Should I give vasopressin without giving steroids? I rely on the current guidelines, obtaining source control, giving fluid, and then giving norepinephrine. If that does not work, I consider vasopressin and steroids, do not worry about measuring cortisol levels, and usually order vasopressin before steroids. (Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: Sepsis

Print Tag: Refer to original journal article
In patients with clinically suspected acute appendicitis, initial US evaluation with complementary contrast-enhanced CT provides high diagnostic accuracy without apparent adverse events from a delay in treatment.

**Background:** The use of either preoperative ultrasonography (US) or contrast-enhanced CT scanning enhances the diagnostic accuracy of acute appendicitis. Most studies have involved direct comparisons without examining complementary use of these 2 modalities.

**Objective:** To assess the accuracy of a pathway for diagnosing acute appendicitis using US and complementary CT.

**Design:** Prospective, protocol-driven study.

**Methods:** Patients (age range, 18 to 80 years) suspected of having acute appendicitis at a community teaching hospital were considered. A total of 151 patients entered into a protocol in which patients suspected of having acute appendicitis underwent operation when initial US findings supported the diagnosis. If US findings were negative or equivocal, patients underwent CT and proceeded to operation if CT findings were consistent with acute appendicitis. Patients were observed if the findings did not support the diagnosis. Results of US and CT were correlated with surgical findings, histopathology, and follow up.

**Results:** Of 151 patients clinically suspected of having acute appendicitis, 79 (52%) were US-positive for acute appendicitis. All of these patients went on to appendectomy; 71 (90%) had acute appendicitis confirmed at operation (5 perforated), while 8 patients did not. Of the remaining patients, 60 had negative or inconclusive US and 12 had an alternative US and CT diagnosis. Of the 60 patients with negative US, 21 (35%) subsequently had a CT scan positive for acute appendicitis; all of these cases were confirmed at operation (3 perforations). All of the 39 patients (65%) with a negative CT scan were observed and had complete recovery without surgery. Overall, 100 of 151 patients with clinically suspected acute appendicitis underwent operation; 92 patients had confirmed appendicitis. Three of the 8 patients without confirmed appendicitis had an alternative diagnosis, and 5 patients had no diagnosis. The sensitivity of the diagnostic pathway (n=151) was 100%, specificity was 86%, positive predictive value was 92%, negative predictive value was 100%, and accuracy was 95%. There was no significant difference in patient age, gender, clinical signs and symptoms (pain, fever, or leukocytosis), or body mass index among patients within the pathway.

**Conclusions:** In patients with clinically suspected acute appendicitis, initial US evaluation with complementary contrast-enhanced CT provides high diagnostic accuracy without apparent adverse events from a delay in treatment. Use of US as an initial imaging modality avoids many of the disadvantages of CT. Observation of patients having both a negative US and CT scan is safe.

**Reviewer's Comments:** Although past studies have evaluated US versus CT in head-to-head comparisons, this is the first study to consider using both methods, and it provides reasonably good evidence of accuracy. Of course, an important issue not addressed is cost; 52% of patients required only US, but 48% required both US and CT. (Reviewer-Todd A. Kellogg, MD).

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Keywords: Acute Appendicitis

Print Tag: Refer to original journal article
The laparoscopic TEP approach to recurrent inguinal hernias results in less early and chronic postoperative discomfort and a faster return to work.

**Objective:** To compare the Lichtenstein hernioplasty (open mesh repair) with a laparoscopic totally extraperitoneal preperitoneal (TEP) technique for treatment of recurrent inguinal hernias.

**Design:** Prospective, randomized trial.

**Methods/Participants:** Over a 5-year period, 99 consecutive patients with recurrent inguinal hernias were considered for this study. These patients were prospectively randomized to undergo either open mesh repair or laparoscopic TEP repair. Patient demographics, comorbidities, risk factors, time to recurrence, primary hernia type, primary repair technique, recurrent symptoms, intraoperative factors, and postoperative complications were recorded. Clinic follow-up occurred at 3 weeks and then annually for years 1 to 3, with telephone follow-up between 5 and 10 years postoperatively. The primary outcomes were hernia recurrence and chronic pain.

**Results:** Preoperatively, patients with recurrent inguinal hernia undergoing open repair did not differ significantly from those undergoing TEP repair. The male-to-female ratio, mean age (57.2 ± 12.5 years), mean body mass index (25.4 kg/m2), occupation (physical vs non-physical employment), comorbidities, anticoagulation, American Society of Anesthesiologists risk, previous surgery, number of hernia repairs, primary hernia type and repair technique, and preoperative symptoms did not differ significantly. Considering intraoperative factors, the type of anesthesia was the only significant difference between the 2 groups (open mesh repair, 46 spinal and 1 general vs TEP, 0 spinal and 49 general; *P* < 0.001). No recurrences were observed in the TEP group, while 3 (6.4%) were seen in the open mesh repair group (*P* = 0.11). Early and chronic postoperative pain was more frequent in the open mesh repair group; the open mesh repair group required more postoperative pain medication than the TEP group (4.4 vs 3.0 doses; *P* = 0.02), and chronic pain was reported by 13 (27.7%) open mesh repair patients versus 4 (8.2%) TEP patients (*P* = 0.02). Return to work was delayed in patients undergoing open mesh repair compared to those undergoing TEP (17.9 vs 14.8 days; *P* = 0.05).

**Conclusions:** The laparoscopic TEP approach to recurrent inguinal hernias results in less early and chronic postoperative discomfort, sooner return to work, and a tendency toward fewer recurrences.

**Reviewer’s Comments:** As a firm believer in the laparoscopic approach for recurrent inguinal hernias before this study was published, it is difficult to voice an objective opinion. The benefits of the laparoscopic approach are fairly obvious: virgin tissue planes; an excellent look at the entire inguinal floor and potential defects; and very limited (if any) need to contend with the previously placed mesh. One would expect the rate of recurrence after TEP to be at least as low as the open approach given what is known from the primary repair literature, which suggests roughly equivalent recurrence rates. (Reviewer-Todd A. Kellogg, MD).

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Keywords: Hernioplasty

Print Tag: Refer to original journal article
One week after parathyroidectomy, a calcium level ≥9.7 mg/dL is associated with recurrent hyperparathyroidism, suggesting that postoperative surveillance of these patients may have cost/benefit advantages.
Side-to-side hepaticojejunostomy allows wide patency, precise construction, and anastomosis to a well-vascularized bile duct.

**Objective:** To present experience with side-to-side hepaticojejunostomy (HJ) for biliary injury emphasizing management and outcomes.

**Design:** Retrospective review.

**Methods:** Patients who failed stenting and underwent HJ at a single institution for iatrogenic injury from 1992 to 2006 were included. Repairs were performed by 4 surgeons (75% by 1 surgeon). "Poor" outcomes included postoperative stent for >3 months, postoperative jaundice or cholangitis, or intervention for anastomotic stricture. Follow-up was 5 years.

**Results:** 113 patients underwent reconstruction. Most injuries (96%) occurred during laparoscopic cholecystectomy versus 12 during the open procedure and 6 during other procedures. Injuries were identified at the index operation in 41 cases (37%). Of 72 cases recognized postoperatively, 36 (51%) were evident at <1 week. Twenty-five of 113 cases were reconstructed at the referring institution (8 duct-to-duct). Injuries at or above the confluence (E3-5) occurred in 50 of 113 cases, and 48 of 113 cases were isolated right hepatic duct (B, C, E4, E5). Arterial injury was suspected in 11.5% of cases. Primary repairs were performed in 88 of 113 cases (22 early, 66 delayed), and secondary repairs were done in 25 cases. Side-to-side anastomoses were accomplished in 104 cases (92%). One death (0.9%) occurred. Complications were noted in 22 cases (19.6%), including 12 (11%) wound infections and 7 (6%) anastomotic leaks. Three patients received antibiotics alone. Four patients needed percutaneous drains or stent exchange. One patient required decortication, and 2 (1.8%) had an MI. Mean follow-up was 5.1 ± 3.9 years. Excellent outcomes occurred in 106 cases (95%). Six patients had poor outcomes. One patient had cholangitis, 5 had anastomotic problems, and 3 needed prolonged stenting. Discussion: Side-to-side HJs were highly successful with low mortality, low morbidity, and few long-term problems. No additional reconstructions were necessary. Side-to-side anastomoses allow wide patency (not limited by bile duct diameter), precise anastomoses (posterior row is not buried in scar tissue), and well-vascularized bile ducts due to minimal posterior dissection and anastomoses away from the end of the duct where blood flow is inadequate. Associated arterial injury and timing of surgery are also key. Delayed primary repair (3 months) is advocated whenever the duct is ischemic to allow it time to "die back" to well-vascularized tissue. Early primary repairs should be created well cephalad to the divided end, and MR or CT angiography is recommended to exclude associated arterial injury.

**Conclusions:** Side-to-side HJ anastomoses have theoretical advantages and are usually possible; 95% excellent anastomotic function without intervention attests to the benefit.

**Reviewer's Comments:** 75% of the repairs were done by a single surgeon, which questions reproducibility. However, the logic behind side-to-side anastomoses and delayed repair for combined vasobiliary injuries is sound, and outcomes were excellent. (Reviewer-Kathleen Christians, MD).

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Keywords: Bile Duct Injury

Print Tag: Refer to original journal article
Activation of the coagulation system persists for at least 4 weeks after surgery.

**Background:** Cancer increases risk of venous thromboembolism (VTE) 4-to 6-fold. VTE in cancer patients suggests advanced, aggressive disease.

**Objective:** To review the risk, etiology, prevention, and treatment of VTE in surgical oncology patients

**Methods:** Literature review.

**Results:** Risk factors for VTE in cancer patients undergoing surgery include age >60 years, previous VTE, advanced cancer, anesthesia lasting >2 hours, and bed rest >3 days. Increased procoagulant activity plus relevant coagulation system components at the tumor and less anticoagulant activity explain hypercoagulability of malignancy. Idiopathic VTE patients need targeted screening for prostate, colon, and bladder cancer in men and endometrial cancer in women. Low-dose heparin and graded compression stockings provide better protection against deep vein thrombosis (DVT) than low-dose heparin alone. Sequential pneumatic compression stockings increase venous flow and combined with heparin, reduce pulmonary embolism (PE) incidence. Graduated compression stockings further enhance efficacy. Low molecular weight heparin (LMWH) is at least as effective and safe as unfractionated heparin (UFH) for perioperative thromboprophylaxis with less risk of heparin-induced thrombocytopenia. Adults with cancer should receive LMWH: dalteparin 5000 units (U) sc daily, enoxaparin 40 mg sc daily, or tinzaparin 4500 U sc daily or 75 U/kg daily; fondaparinux 2.5 mg sc daily, or UFH 5000 U sc thrice daily. Coagulation system activation persists at least 4 weeks after surgery. Forty-percent of VTEs during thromboprophylaxis occurred >21 days postoperative and 45% occurred after prophylaxis withdrawal. Thromboprophylaxis for 3 more weeks reduces the risk of VTE by approximately 60%. LMWHs are as efficacious as UFH in reducing recurrent thrombosis with less bleeding risk. Caval filters are limited to cases of active bleeding and multiply recurrent VTEs despite therapeutic LMWH. The annual risk of recurrent VTE in cancer patients is 21% to 27%. The incidence of recurrent VTE and major bleeding in cancer patients given at least 3 months of anticoagulant therapy was 27.1% vs 9% and 13.3% vs 2.1% per patient-year and is the basis for long-term anticoagulation for cancer patients after initial thrombosis. LMWH is the preferred long-term treatment for proximal DVT or PE and the prevention of recurrent VTE in cancer patients. Warfarin is another option. Anticoagulation should continue at least 3 to 6 months for DVT and 6 to 12 months for PE. Catheter-associated thrombosis is treated while the catheter is present and 1 to 3 months after removal. LMWH improves survival in cancer patients (HR, 0.83 and advanced disease, HR, 0.86).

**Conclusions:** In-hospital thromboprophylaxis with LMWH or UFH with graded stockings has been validated. LMWH replaces UFH for initial VTE treatment. Long-term LMWH instead of oral anticoagulants substantially reduces the risk of recurrent VTE without increased bleeding. LMWH may also improve patient survival.

**Reviewer’s Comments:** An excellent summary of the current literature regarding the risks, etiology, prophylaxis, and treatment options for VTE in surgical patients with cancer. (Reviewer-Kathleen Christians, MD).

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Keywords: Venous Thromboembolism

Print Tag: Refer to original journal article
Antibiotic-Coated Sutures Reduce SSIs

Antibiotic Coating of Abdominal Closure Sutures and Wound Infection.
Justinger C, Moussavian MR, et al:

Surgery 2009; 145 (March): 330-334

Triclosan sutures reduce surgical site infection.

**Background:** Surgical site infection (SSI) is a risk for all surgical patients. The risk is often discussed in 3 areas consisting of the patient, surgeon, and environment. A number of interventions try to reduce the impact of risk factors related to all 3 areas. Most emphasis is placed on proper use of perioperative antibiotics. Operative techniques are important, but are usually described as proper tissue handling and avoiding contamination.

**Objective:** To determine if sutures coated with triclosan can reduce surgical site infection in abdominal wounds.

**Design:** Retrospective review of patients having an abdominal operation.

**Participants:** 2,088 patients had an abdominal operation during 2 time periods.

**Methods:** Wound closure was altered during the 2 time periods; 1,045 patients had midline wounds closed with uncoated polydioxanone sutures (PDSs) and 1,043 had wound closure with coated Vicryl sutures. Demographic information was collected on all patients. The primary outcome was the number of surgical site infections. A SSI was defined by erythema, induration, pain, and discharge of fluid. Risk factors for SSIs were also collected.

**Interventions:** Running sutures were used with both products. The Vicryl was impregnated with triclosan. Patients in both groups received perioperative antibiotics.

**Results:** 11% of the PDS wounds and 5% of the Vicryl wounds became infected; this difference was significant. The types of operative procedures and perioperative parameters were similar between the groups, and no difference in risk factors was noted between groups.

**Conclusions:** A coated suture reduced SSIs in midline laparotomy wounds.

**Reviewer's Comments:** An antibiotic-coated suture reduces SSIs. Are you a believer or not? Antibiotics in the wound at the end of an operation would be a similar tactic to reduce SSIs. Topical antibiotics have not reliably reduced SSI rates. Should we believe these data? First, is triclosan an antiseptic or antibiotic? I favor antiseptic. What about resistance as this suture is used more often? There is no mention of this as a problem. Additionally, what about patient sensitivity? Finally, how long does the coating remain effective? These questions need answers. The author's call for a large study is appropriate and necessary before any recommendation of the wholesale use of an impregnated antibiotic or antiseptic suture. (Reviewer-John A. Weigelt, MD).

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Keywords: Wound Infection

Print Tag: Refer to original journal article
Autogenous AVFs have fewer complications than prosthetic fistulas.

**Background:** Arteriovenous access procedures for dialysis use autogenous or prosthetic material. The radial-cephalic (RC) autogenous arteriovenous fistula (AVF) is recommended for first time access. Other types of AVFs include brachial-cephalic (BCAVF) and brachial-basilic (BBAVF). All can be constructed as an autogenous or prosthetic AVF.

**Objective:** To determine outcomes of commonly used AVFs for dialysis.

**Design:** Retrospective review of a single hospital experience.

**Participants:** 2,422 patients having an AVF established.

**Methods:** A central database was used to identify patients with an AVF. The type of AVF was recorded as well as procedures to maintain patency. The primary end point was the primary patency rates of the different AVFs. Maximum follow-up was 20 years, and actuarial patency rates were calculated using Kaplan Meier analysis.

**Interventions:** The type of AVFs established included RCAVF, BCAVF, BBAVF, and prosthetic with polytetrafluoroethylene (PTFE).

**Results:** The most common first choice for an AVF was RC, but 17% of these had to be abandoned secondary to an inadequate vein or artery. The median primary patency rate for RCAVF was 712 days, 1,009 days for BCAVF, 1,582 days for BBAVF, and 384 days for prosthetic PTFE AVF. First year patency rates were also calculated at 70% for RCAVF, 74% for BCAVF, 79% for BCAVF, and 58% for prosthetic PTFE AVF. Complications were lowest for RCAVF and BCAVF and highest for prosthetic PTFE AVF.

**Conclusions:** Autogenous AVFs have better patency rates and lower complications than prosthetic AVFs. The BBAVF autogenous graft might be considered earlier as an AVF choice before a prosthetic graft.

**Reviewer's Comments:** An autogenous AVF is obviously the first choice when dialysis is anticipated. Technical problems related to small arteries and veins and the need for dialysis before primary AVF maturation continue to plague patient and surgeon. This very large series supports the use of autogenous AVFs. The data also support a growing body of literature suggesting a BB autogenous AVF is better than a prosthetic AVF. While more technically demanding to establish, a BBAVF appears to have better patency rates and fewer complications than a prosthetic AVF and even better than an autogenous BCAVF. Given the technical difficulties, this recommendation will probably take a long time to establish itself, but it is still worth some thought. (Reviewer-John A. Weigelt, MD).

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Keywords: Hemodialysis

Print Tag: Refer to original journal article
Most guidelines are based on Class II data.

**Background:** Clinical practice guidelines are ubiquitous. Many are developed by professional organizations and all purport to use the best evidence available.

**Objective:** To review the rigor of existing practice guidelines from the American College of Cardiology (ACC) and American Heart Association (AHA).

**Design:** Prospective review of existing guidelines. **Materials:** 53 guidelines on 22 topics were reviewed. These guidelines contain 7,196 recommendations.

**Methods:** The guidelines were reviewed to determine the class of evidence to support the recommendation. This included Class I, II, or III recommendations and the level of evidence as A, B, or C. Class I means the recommendation is supported and useful. Class II has conflicting evidence for usefulness, and Class III has no supporting evidence for usefulness and may be harmful. Level A evidence indicates multiple randomized trial data, level B evidence could be 1 randomized trial, and level C evidence is expert opinion. The primary outcome was to establish the level of evidence used in generating ACC/AHA guidelines.

**Interventions:** Guidelines were placed into 3 categories: disease, diagnostic, and intervention. The most recent guideline was used to assess the level of evidence.

**Results:** Among the 53 guidelines, 24 were disease oriented, 14 were diagnostic oriented, and 15 were intervention oriented. Only 17 of the original 52 guidelines were currently listed on the ACC website. Twelve of these 17 were revisions of older guidelines. The mean time for a revision was 5 years for disease guidelines, 8 years for diagnostic guidelines, and 5 years for intervention guidelines. Using only the revised guidelines, the number of recommendations increased from 1930 to 1973 (48%). Level A evidence accounts for 11% of recommendations to practice guidelines, and level C evidence accounts for 48% of recommendations to practice guidelines. Over time, more class II recommendations appeared, while the number of class I recommendations remained the same and the number of Class III recommendations fell.

**Reviewer’s Comments:** Herein lies a problem. Physicians want to do the best for their patients. We would like to use the best evidence (Level IA) to make our decisions. However, our world is not filled with this type of evidence. This review of cardiac clinical guidelines can be repeated for all specialties. Our best practices are rife with less than great data upon which we make our decisions. The real question is what to do about this. Should professional organizations push guidelines when the evidence is less than stellar? Should we limit best practice guidelines to those areas where we do have the data? That would probably simplify the number of recommendations, but would it have negative consequences on our medical care? Without consensus, it is difficult to say a negative outcome would ensue. Maybe the value of decreased variation when a guideline is accepted and followed is the only benefit we can expect until more data are presented; a true quality conundrum. (Reviewer-John A. Weigelt, MD).

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**Keywords:** Practice Guidelines

**Print Tag:** Refer to original journal article
Among neurologic intensive care patients on intensive insulin therapy, hypoglycemic episodes are more frequent, but infections are reduced.

Objective: The benefits of tight glucose control in the critically ill continue to be hotly debated. Bilotta et al report on intensive insulin control in a neurologic critical care population.

Design/Participants: Randomized, prospective, controlled trial aimed at keeping blood glucose levels between 80 and 110 mg/dL or <215 mg/dL in patients admitted to a neurosurgical ICU. Patients with insulin-dependent diabetes were excluded from the trial, as were patients with an anticipated ICU length of stay (LOS) <3 days, as were those not anticipated to survive.

Methods: Randomization was done in blocks of 10, stratified by disease type (neurovascular disease, severe head trauma, tumor, or intraparenchymal hemorrhage). Insulin drips were used in both groups, with blood glucose levels measured every 4 hours or 1 hour after changing the insulin drip rate. All patients were fed enteral nutrition (parenteral if enteral feeding was not tolerated) at 20 to 30 kcal/kg per day. The primary outcome was safety, defined as the number of hypoglycemic episodes <50 mg/dL. Efficacy end points were infection, mortality, ICU LOS, and Glasgow Outcome Score (GOS) at 6 months.

Results: 495 patients were screened during the 42-month study period, with only 12 excluded; 241 patients were randomized to intensive insulin therapy and 242 to conventional insulin therapy. There were no differences in baseline characteristics between the 2 groups. In the intensive insulin therapy group, 96% of patients required insulin compared to 76% in the conventional therapy group. The median number of hypoglycemic episodes was 8 in the intensive insulin therapy group and 3 in the conventional therapy group, with a low of 0 in both groups and a high of 23 reported in the intensive insulin therapy group. There was no difference in overall survival or GOS at 6 months. Ventilator days, infections, and ICU LOS were significantly lower in the intensive insulin therapy group.

Conclusions: Intensive insulin therapy increases the rate of iatrogenic hypoglycemia, but is associated with fewer infections and reduced ICU LOS.

Reviewer’s Comments: The difference in infection rates is almost all due to a higher incidence of urinary-related sepsis in the conventional therapy group; other infections show either no difference between groups or a higher incidence in the intensive insulin therapy group. The study was powered to find a difference in hypoglycemic episodes. To find an efficacy difference suggests that it is real, and the lack of mortality or outcome difference is reassuring in light of other recent data. The shorter LOS in the intensive insulin group suggests that the need for an insulin drip was not a reason for ICU care. As more data showing the benefit of intensive insulin control in at least some subpopulations are available, it is clear that this will need to become part of routine floor care. (Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: Neurocritical Care

Print Tag: Refer to original journal article
Does Team Training Improve Perception of Teamwork?

Surgical Team Training: The Northwestern Memorial Hospital Experience.

Halverson AL, Andersson JL, et al:

Arch Surg 2009; 144 (February): 107-112

Team training requires significant investment of time and resources, with decaying results over time.

**Background:** Team training has been suggested to improve patient safety as well as participant satisfaction. The operating room (OR) team from Northwestern Memorial Hospital shares short-term results after implementing team training across the OR.

**Methods:** A 4-hour curriculum in team training was developed by individuals in the departments of surgery, anesthesia, nursing, hospital quality, and education. Modules addressed team functioning, communication skills, and implementation plans. A train-the-trainer concept was employed for dissemination, first teaching 40 trainers, with these people responsible for teaching the rest of the trainees. All OR personnel, including residents, were assigned to a 4-hour training session and were not allowed to work if they did not attend. Hospital quality metrics, survey results, and direct intraoperative assessment were use to evaluate short-term effectiveness 6 months after implementation. The direct assessment primarily evaluated whether all elements of the preoperative and postoperative briefings were performed; these were compared to preimplementation observations.

**Results:** 1150 individuals were trained during a 2-week period; elective volume was reduced during this period to accommodate the necessary training time. Compliance with all elements of the time-out improved from 47% before implementation to 86% after implementation. Two weeks after implementation, preoperative briefings were held in 86% of cases. This decreased to 66% at 6 months. Announcement of hand-offs remained poor, with none of the anesthesiologists announcing handoffs, 20% of the surgical techs, and 38% of the circulating nurses announcing changes in personnel. The perception of teamwork after implementation improved in 14 of 19 questions asked about team functioning and attitude. Surgeons had a more positive perception of teamwork both before and after implementation than either nurses or anesthesiologists. The perceived benefit of a preoperative briefing was greater in nurses and anesthesiologists than surgeons.

**Conclusions:** Team training results in moderate compliance with established behaviors and improved perception of teamwork.

**Reviewer's Comments:** The effort behind implementing and evaluating this team training is enormous (the time invested in training the trainers, ensuring that all OR personnel attended, and then monitoring compliance). The authors do not provide an estimate of the cost of the program, but it is likely staggering. Given the decay of compliance over time, additional investment in sustainability efforts will also be needed. A previous study demonstrated the tangible improvement in outcomes with the worldwide implementation of a surgical checklist, resulting in a World Health Organization recommendation and adoption by many hospitals dedicated to improving patient safety. The authors highlight some of the difficulties they encountered during implementation, primarily related to lack of buy-in. It is likely that improvements in patient safety are at least somewhat related to culture change, which will take more than rote implementation of a one-size-fits-all surgical checklist. (Reviewer-Karen J. Brasel, MD, MPH).

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Keywords: Team Training

Print Tag: Refer to original journal article
INRs between 4.5 and 10 require only warfarin withdrawal and reinstitution once the INR reaches therapeutic range, not low-dose vitamin K.

**Background:** Warfarin prevents venous thromboembolism (TE), but has unpredictable dose responses requiring monitoring. Vitamin K (1 to 2.5 mg) reduces international normalized ratios (INRs), but whether this reduces bleeding without increasing TE risk is unknown.

**Objective:** To determine if low-dose oral vitamin K reduces bleeding events over a 90-day period in warfarin-associated coagulopathy.

**Design:** Multicenter, randomized, placebo-controlled trial.

**Methods:** Nonbleeding patients on warfarin with INRs of 4.5 to 10.0 were included. Warfarin was held for 24 hours, and patients were randomized to vitamin K (1.25 mg) or placebo; participants were blinded. Primary outcome was bleeding frequency. Major bleeds included fatality, ≥2 units of packed red blood cells (PRBCs) administered, therapeutic intervention required (eg, endoscopy), or enclosed space hemorrhage. Secondary outcomes were major bleed frequency, arterial or venous TE, and death. Warfarin was reinstituted once therapeutic INRs were reached after study drug administration. Primary analysis was an intention-to-treat comparison of patients in the 2 groups with ≥1 bleeding episodes.

**Results:** Out of 724 patients, 355 received vitamin K, 369 received placebo, and 12 were unknown. Fifty-six of the 355 vitamin-K patients (15.8%) and 60 of the 369 placebo patients (16.3%) bled. Major bleeds occurred in 9 vitamin-K patients (2.5%) and 4 placebo patients (1.1%). Within 7 days, 28 vitamin-K patients (7.9%) and 34 placebo patients (9.2%) bled (3 major and 2 out of 3 with placebo). In 90 days, 4 patients (1.1%) given vitamin K and 3 patients (0.8%) given placebo suffered TE (2 within 7 days). Within the 90 days, 7 vitamin-K patients (2%) and 7 placebo patients (1.9%) died; none were due to TE. The average INR decrease for vitamin K was 2.8 INR units versus 1.4 INR units with placebo. The day after the study drug was given, 25 vitamin-K patients (7.6%) and 3 placebo patients (0.9%) had INRs <2.0. Patients ≥70 years sustained 10 of the 13 major bleeds. No differences in overall or major bleeding frequency occurred with vitamin K. INRs corrected more rapidly, but vitamin K did not effectively reduce bleeding in overanticoagulated patients. There were no between-group differences in stroke or TE. Death and TE were rare and balanced suggesting low-dose vitamin K is safe and does not cause thrombosis. The data support treating INRs between 4.5 and 10.0 with warfarin withdrawal and reinstitution once the INR has decreased into a therapeutic range. This is not applicable to patients actively bleeding who require acute normalization of INRs or have INRs >10.0. **Conclusion:** Low-dose oral vitamin K corrects supratherapeutic INRs, but does not substantially reduce bleeding event frequency and has little effect on outcomes. 

**Reviewer's Comments:** Strengths of this study include randomization with concealed allocation, blinded participants, intention-to-treat analysis, and excellent follow-up. It was not powered to detect small differences in major bleeding event frequency nor could open-label vitamin K administration be ruled out. It did not monitor INR testing or warfarin dosing after enrollment nor did it mandate INRs the day after study drug. (Reviewer-Kathleen Christians, MD).

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Keywords: Warfarin-Associated Coagulopathy

Print Tag: Refer to original journal article
**Pathologic Response to Neoadjuvant XRT Affects Survival in Rectal Cancer**

*Improvement of Survival With Response to Neoadjuvant Radiation Therapy for Rectal Cancer.*

Castaldo ET, Parikh AA, et al:

Arch Surg 2009; 144 (February): 129-134

Rectal adenocarcinoma patients downstaged after neoadjuvant XRT have better survival than nonresponders, but DSS is still better for those with stage I disease who undergo resection alone.

**Objective:** To determine whether a complete or near-complete response to neoadjuvant radiation therapy (XRT) improves survival compared to lesser responses and to compare survival of patients downstaged to stage I disease undergoing resection alone.

**Design:** Retrospective cohort study.

**Methods:** Rectal adenocarcinoma patients who received neoadjuvant XRT and had American Joint Commission on Cancer stage 0 to III on surgical pathology between January 1, 1994, and December 31, 2003 were obtained from the Surveillance, Epidemiology, and End Results (SEER) registry. Exclusions were second primaries, XRT other than neoadjuvant external-beam, no resection, local excision only, or incomplete data. The secondary analysis included patients with stage I disease undergoing resection alone, excluding local excisions. "Responders" to neoadjuvant XRT were stage 0 or I at resection (downstaged), and "nonresponders" still had pathologic stage II or III disease.

**Results:** Of the 10,971 patients, 3760 received neoadjuvant XRT; 21% were responders and 79% were nonresponders; 7211 patients with stage I disease underwent resection alone. The median follow-up was 31 months (range, 0 to 119 months). Death from rectal cancer occurred in 493 patients (4%). Three- and 5-year disease-specific survival (DSS) for responders was 97% and 94% versus 86% and 78% for nonresponders. Cox regression (CR) showed worse DSS in patients ≥60 years of age, women, African Americans, and those with poorly differentiated or anaplastic tumors. Overall survival (OS) at 3 and 5 years for responders was 91% and 82% versus 74% and 60% for nonresponders. OS was worse for those ≥60 years of age, African Americans, and patients with poor or anaplastic tumors. DSS at 3 and 5 years for patients with stage I disease and undergoing resection alone was 98% and 97%. DSS was significantly better for these patients compared with responders. Three- and 5-year OS in patients with stage I disease undergoing resection alone was 88% and 79%. Responders had a 3- and 5-year OS of 91% and 82. Responders downstaged to stage 0 or I on surgical pathology have improved DSS and OS compared to those remaining at stage II or III. Patients downstaged to stage 0 or I have excellent DSS (approximately 94% at 5 years). However, responders’ DSS is significantly less than those with stage I disease not requiring neoadjuvant XRT (approximately 97% at 5 years). Stage II or III patients with complete or near-complete response to neoadjuvant XRT can achieve similar survivals to patients with stage I disease. Responders may undergo local excision alone with excellent long-term outcomes.

**Conclusions:** Neoadjuvant XRT responders have improved survival compared with nonresponders. DSS is excellent for responders, but does not equal DSS for stage I disease patients undergoing resection alone.

**Reviewer’s Comments:** SEER lacks (1) preoperative stages, (2) recurrence (unknown disease-free survival), (3) chemotherapy data (effects OS, DSS, and synergism with XRT), and (4) XRT specifics. Response to neoadjuvant XRT may prove a reliable surrogate for systemic control and long-term outcome. (Reviewer-Kathleen Christians, MD).

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Keywords: Rectal Cancer

Print Tag: Refer to original journal article
What Surgical Complications Should Really Be Reported?  

Application of a Novel Severity Grading System for Surgical Complications After Colorectal Resection.  

Mazeh H, Samet Y, et al:  
J Am Coll Surg 2009; 208 (March): 355-361

Computerized quality reporting systems are feasible and have higher sensitivity for recording minor complications that prolong LOS.

**Objective:** To validate a computerized system for reporting and grading surgical complications in colorectal surgery.

**Methods:** Colorectal resections at a single institution between January 1999 and December 2004 were reviewed. Complications were classified and graded. Grade 1 complications were minor, asymptomatic, and required no intervention. Grade 2 complications required medication, minor interventions, or a prolonged hospital length of stay (LOS). Grade 3 required interventional radiology or endoscopy, Grade 4 necessitated surgery or caused permanent loss of function, and Grade 5 resulted in death.

**Results:** 408 patients underwent resection. Emergency surgeries occurred in 24.3% of the patients, laparoscopic in 20.8% (10.5% converted), and 77.5% of procedures were for cancer; 239 patients (58.6%) had uneventful recoveries. In the remaining 169 patients, 247 complications occurred, with Grades 1 and 2 accounting for 76.1% and Grades 3 to 5 accounting for 14.5%; mortality was 1.7%. Surgical site infection (SSI), transfusion, and atelectasis accounted for 18.6% of all complications. Elective operations had lower complication rates than emergency surgeries (35.9% vs 59.6%); all 7 deaths occurred in emergency operations. Laparoscopic complications were lower than open complications (23.5% vs 46.1%). There was no difference between colon and rectal procedures. Complication number was strongly associated with increased LOS as was complication grade. Median LOS for Grades 1 to 4 was 10.6 to 17.7 days. SSI occurred in 8.8%; 78% were Grade 1 and were more common after emergencies (7.1% vs 14.1%), but similar in laparoscopic versus open operations (8.2% vs 9.0%). Intraabdominal abscess (IAA) occurred in 35 patients (8.6%) and 57.1% required percutaneous drainage. Anastomotic leak occurred in 13 (3.2%), and all were re-operated, with a median 17-day LOS; 1 died. Transfusion was a Grade 2 complication if 2 units of packed red blood cells were given (21 patients). Atelectasis and pneumonia each occurred in 3.7% of patients, with pneumonia more commonly after emergency surgery (7.1% vs 1.9%). Grade 3 to 5 complications were within reported ranges. Grade 1 and 2 complications were much higher than previously reported, suggesting previous underreporting. The complication rate, especially mortality, was much lower in elective operations. Grades 1 and 2 complications were associated with prolonged LOS suggesting they should be reported and prevented. There was an increased risk for fatal complications with ≥2 comorbidities, but the postulated cause was emergency surgery. The overall complication rate was considerably higher for emergency operations. Comorbid conditions were related to surgical complications, with a higher rate in patients with ≥ comorbidities.

**Conclusions:** This complication reporting system was feasible and had a higher sensitivity for recording minor complications that tend to prolong hospital stay.

**Reviewer's Comments:** Standardized definitions and reporting are necessary for quality assessments, but computerized systems such as these still require accurate data input and interpretation of results to provide clinically meaningful value. (Reviewer-Kathleen Christians, MD).

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Keywords: Colorectal Surgery Complications

Print Tag: Refer to original journal article
RC-AVF should be the initial vascular access procedure for patients who meet specific preoperative criteria as determined by physical examination and US screening.

**Background:** Radiocephalic arteriovenous fistula (RC-AVF) is generally the first choice for hemodialysis access, but several authors have reported early thrombosis or the failure of RC-AVFs to mature in up to 20% to 57% of patients. Preoperative venous mapping and arterial evaluation by ultrasonography (US) are important for successful AVF creation.

**Objective:** To determine physical and US examination characteristics that are able to predict success with RC-AVFs.

**Methods:** Medical records of patients who underwent vascular access operations from 2003 to 2008 were reviewed. Physical examination and US screening criteria for creating a RC-AVF included a continuous and uninterrupted outflow forearm vein diameter ≥2.5 mm as measured by US. On physical examination (with a tourniquet), the vein had to be distensible and without stenotic segments. Criteria for arterial inflow included a normal pulse, intraluminal vessel diameter ≥2 mm by US, and an intact palmar arch. An end-to-side venoarterial anastomosis with a venous branching point was used to create a broad patch for the RC-AVF anastomosis. Primary patency was defined as uninterrupted patency without intervention, primary-assisted patency was defined as primary patency with intervention required, and cumulative (secondary) patency was defined as the time from AVF creation to abandonment or completion of the study period.

**Results:** Out of 796 consecutive vascular access operations, 75 RC-AVFs were created in 74 patients. Mean patient age was 57 years (range, 20 to 82 years), 24% were women, 21.3% were obese, 25.3% had chronic renal failure secondary to hypertension, 15% had undergone previous access operation, and 56% were diabetic. Radial artery diameter was 2.0 to 4.5 mm (mean, 3.0 mm) and was larger in men. The new AVF outflow vein was 2.5 to 5.2 mm (mean, 3.0 mm) and also larger in men. Mean follow-up was 14.5 months (range, 1 to 47 months), and the average time to initial use was 1.5 months. Two (2.7%) RC-AVF failures occurred. At 12 months, rates of primary patency, primary-assisted patency, and cumulative patency were 58.3%, 96.2%, and 100%, respectively, and at 24 months, they were 48.1%, 91.5%, and 95.7%, respectively.

**Conclusions:** In patients undergoing RC-AVF, cumulative patency was 100% at 1 year and 95.7% at 2 years. For patients meeting specific preoperative criteria as determined by physical examination and US screening, RC-AVF should be the initial procedure of choice for vascular access. Construction techniques and, more importantly, careful patient selection are essential in creating functional and durable RC-AVFs.

**Reviewer's Comments:** This study provides specific preoperative criteria that can be used to optimize patency of what was once thought of as the procedure of choice for primary vascular access. Unfortunately, only 9% of the patients in this study met these criteria; thus RC-AVF will not be appropriate for 91% of patients in need of vascular access. (Reviewer-Todd A. Kellogg, MD).

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The introduction of EVAR has led to an increase in elective AAA repair and lower mortality rates. There has been a concurrent decrease in AAA rupture and a decrease in total aneurysm-related deaths.

**Background:** The introduction of endovascular aneurysm repair (EVAR) has resulted in a significant change in the management of infrarenal aortic aneurysms. Due to the lower associated mortality, more abdominal aortic aneurysm (AAA) repairs are being performed electively. Despite the lower operative mortality, some harbor concerns that there could still be an increasing number of aneurysm-related deaths.

**Objective:** To determine the impact of EVAR on the (1) annual volume of AAA repair, the (2) number of AAA-related deaths (elective and emergent), and the (3) incidence of rupture.

**Design:** Retrospective review of an administrative database.

**Methods:** The Nationwide Inpatient Sample (NIS) database was queried for the years 1993 to 2005 (using the ICD diagnosis and procedure codes) for patients with intact or ruptured AAA undergoing open repair or EVAR. Patients with both procedures coded during the same hospital stay were recorded as EVAR. Annual volumes were determined and those from the pre-EVAR era (1993 to 1998) were compared with those from the post-EVAR era (2001 to 2005). For each year, the number of repairs, rupture diagnoses without repair, deaths, and associated mortality rates were recorded.

**Results:** Annual AAA repair-related deaths decreased by 42% (4477 to 2618). The use of EVAR has progressively increased; in 2005 EVAR accounted for 56% of intact AAA repairs and 27% of repair-related deaths. The mean number of intact repairs increased from pre-EVAR to post-EVAR (36,122 vs 38,901), while the mean annual number of intact AAA repair-related deaths decreased (1693 vs 1207; \( P<0.0001 \)). When considering all intact AAA-related deaths, there was a significant decrease in the mean annual number of deaths related to intact AAA repair from the pre-EVAR to the post-EVAR eras (4.0% to 3.1%; \( P<0.0001 \)). However, open repair-related mortality was not statistically different (4.7% to 4.5%; \( P=0.31 \)). EVAR-related mortality was 1.3%. Considering ruptured repairs, the mean annual number decreased pre-EVAR to post-EVAR from 2804 to 1846 as did the number of ruptured AAA-related deaths (2804 to 1846; \( P<0.0001 \)), and ruptured AAA-related mortality (44.3% to 39.9%; \( P<0.0001 \)). There was a significant decrease in open repair-related mortality during this time (40.8% vs 44.3%; \( P<0.001 \)), while the EVAR-related mortality was 32.4%. Considering the overall mean number of ruptured AAA diagnoses, there was a significant decrease pre-EVAR to post-EVAR (9979 vs 7773; \( P<0.0001 \)). The overall mean annual deaths from ruptured AAA also decreased significantly (5338 vs 3901; \( P<0.0001 \)).

**Conclusions:** EVAR had led to an increase in elective AAA repair and lower mortality rates. There has been a concurrent decrease in AAA rupture and a decrease in total aneurysm-related deaths.

**Reviewer’s Comments:** Administrative database-generated studies have significant limitations; they tend to be long on data and short on meaning. However, this study does point out some interesting trends that seem to be shaped by the introduction of new technology. Providing anatomic data and addressing regional variations would strengthen this study. (Reviewer-Todd A. Kellogg, MD).

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Keywords: Endovascular Aneurysm

Print Tag: Refer to original journal article